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(11) **EP 0 691 100 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
12.05.1999 Bulletin 1999/19

(51) Int. Cl.⁶: **A47L 15/42**

(21) Application number: **95110484.3**

(22) Date of filing: **05.07.1995**

(54) **Household appliance of the built-in type**

Eingebautes Haushaltgerät

Appareil domestique intégré

(84) Designated Contracting States:
DE ES FR GB

(30) Priority: **06.07.1994 IT TO940555**

(43) Date of publication of application:
10.01.1996 Bulletin 1996/02

(73) Proprietor:
Merloni Elettrodomestici S.p.A.
60044 Fabriano (AN) (IT)

(72) Inventors:
• **Mariani, Pietro**
I-60044 Fabriano (AN) (IT)

• **Palpacelli, Mirco**
I-60035 Jesi (AN) (IT)

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• **PATENT ABSTRACTS OF JAPAN vol. 9, no. 84**
(M-371) (1807) 13 April 1985 & JP-A-59 212 625
(MATSUSHITA DENKI SANGYO KK) 1 December
1984

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Description

[0001] The present invention refers to a household appliance of the built-in type, in particular a dishwashing machine, as described in the preamble of the annexed main claim.

[0002] It is known that industrially produced household goods may be distinguished in two kinds: the so called free standing appliances and the so called built-in appliances.

[0003] Household goods of the first type are destined, after purchasing, to be arranged in any position within the home (kitchen or otherwise), independently from the other domestic furniture; such appliances are thus purchased alone and arranged by the user, in a position considered to be the most convenient. The built-in appliances are on the other hand destined to be purchased not by the final user, but by a modular furniture retailer, who in turn will provide for integrating the appliances with other furniture, normally as built-in components in cabinets; in such cases, typically for refrigerators and dishwashing machines, the furniture retailer usually applies to the door of the appliance a wooden frontal panel, or of another material following the aesthetic character of the surrounding furniture: the final user will therefore purchase a combination of modular cabinets including the various electrical household goods from among which, for instance, a refrigerator and/or a dishwashing machine (see for instance the *Ariston catalogue Elettrodomestici da Incasso*, by Merloni Elettrodomestici S.p.A., Edition 2.94).

[0004] From among the built-in dishwashers the so called "totally hidden" machines are becoming more and more popular; in such machines the main command and display devices are arranged along the upper edge of the door; when the door is closed, such devices result in being hidden from view and protected by an upper protrusion of the cabinet of the machine and/or by a working top, for instance of marble, which often accompanies cabinet housing dishwashing machines and the other adjacent cabinets: in such types of machine, therefore, the user can only have access to the command and display devices when the door is open. Such realisation clearly allows for rendering the frontal surface of the machine completely free: the loading door can therefore be entirely covered by a decorative panel, so as to completely adapt the machine, from an aesthetic point of view, to the other elements of the kitchen (see for instance the above mentioned *Ariston catalogue Elettrodomestici da Incasso*, page 36, dishwashing machine model L-LS 66 ES, and page 39, dishwashing machine model K-LS 45).

[0005] The "totally hidden" type machines of the type described above do however have a peculiar problem of making it rather difficult for the user to control the state of operations of the machine; such operational control of the dishwashing machine can in fact only be had by slightly opening the door, so as to see the upper edge,

where, as mentioned, the commands and above all the display devices are located, the latter generally being constituted by one or more spy-lights.

[0006] The opening of the door however inevitably determines for safety reasons, the interruption of the eventual operational washing cycle and therefore such operation seems, in a certain sense, rather excessive regards the simple objective of controlling, for instance, the point of the washing cycle reached; such operation is also potentially dangerous due to the fact that, for cheap machines and therefore technologically poor and without appropriate safety means, in the case of suddenly opening the door during washing, the risk exists that a spraying arm of the machine, due to inertia continues to rotate, causing a spray of hot water to strike the user, or the adjacent cabinets, determining possible deformations of the latter.

[0007] The purpose of the present invention is that of overcoming the abovementioned drawbacks and in particular to indicate a totally hidden dishwashing machine in which, in a simple, economic way and without any aesthetic prejudice, the possibility of controlling the operational conditions of the machine is offered to the user, without having to open the door and thus interrupt the eventual operational cycle in function.

[0008] For reaching such purpose, the subject of the present invention is an electrical household appliance of the built-in type, in particular a dishwashing machine, incorporating the characteristics of the annexed claim 1.

[0009] Further aims and advantages of the present invention shall result in being clear from the following detailed description and annexed drawings supplied purely as an explanatory and non limiting example, wherein:

- figure 1 schematically represents a part of a group of modular cabinets of a kitchen with, built-in to the centre, a dishwashing machine of the "totally hidden" type, of the type being substantially known;
- figures 2A and 2B schematically represent a dishwashing machine, of the "totally hidden" type, of the type being substantially known;
- figures 3A, 3B, 3C and 3D schematically represent a dishwashing machine, of the "totally hidden" type, realized according to the details of the present invention.

[0010] In figure 1 a part of a group of modular cabinets of a kitchen with, built-in to the centre, a dishwashing machine of the "totally hidden" type, of the known type is schematically represented. In particular, in figure 1 three flanked cabinets 1, 2 and 3 are represented, having homogeneous styled frontal surfaces and making up part of a modular domestic kitchen; in the central cabinet 3 a dishwashing machine of the "totally hidden" type is installed. With 4 a superior working surface is indicated, covering the cabinet 3 which houses the dish-

washing machine and the adjacent cabinets 1 and 2.

[0011] In figure 2A the dishwashing machine built-in the cabinet 3 of figure 1 is schematically represented, in the door closed position. Such dishwashing machine, of the type in itself known is indicated as a whole with 5, has a body of a metallic material 6 and a loading door 7; to the door 7, for aesthetic purposes, a frontal decorative panel can be associated, that has not been illustrated in the figures for simplicity. With 8 the opening handle of the door 7 is indicated, while 9 indicates a frontal protrusion of the body 6, which extends above the upper edge of the door 7 and results in being slightly raised respect such edge; finally with 4 portion of the upper work top is indicated, previously indicated as a whole in figure 1.

[0012] In figure 2B, the dishwashing machine 5 is illustrated in a condition with the door being slightly open, so as to enable vision of the upper edge of the latter. On such upper edge of the door, indicated with 10, the command devices of the machine are present, indicated with 11, typically made up of keys, and visual signalling devices, indicated with 12, constituted by several luminous spy-lights, built-in within the bulk of the door.

[0013] Such devices 11 and 12, in the door closed condition, result in being protected and hidden from view by the frontal protrusion 9 of the body 5, and by the upper work top 4; therefore the "totally hidden" dishwashing machine of figures 2A and 2B has the drawbacks mentioned in the opening of the present description.

[0014] In figures 3A, 3B, 3C and 3D a dishwashing machine of the "totally hidden" type is schematically represented, realised according to the details of the present invention, in the condition of the door being closed and the door being slightly open; in such figures the same reference numbers have been used as in the previous figures, for indicating technically equivalent elements and in the figures 3A and 3B, for greater clarity, the portion of the upper work top 4 has not been represented.

[0015] As can be seen from figures 3A, 3B, 3C and 3D, the dishwashing machine according to the invention, indicated as a whole with 15, has an element 16, fixed to the frontal protrusion 9, in substantial correspondence to the visual signalling devices 12; with such purpose, the frontal protrusion 9 is equipped with an appropriate seat within which the element 16 can be fixed, for example snap fitted.

[0016] Such element 16 is of the dimensions of such to protrude forward at least to the frontal surface of the door 7 (or, in the case of the mentioned decorative panel, at least to the frontal surface of such); such dimensions are of such to also guarantee the covering of the various visual signalling devices 12 and of such to not cause any hindrance in the closing or opening of the door 7.

[0017] The element 16 has the function of visually reflecting or transmitting the light emitted by the visual

signalling devices or spy-lights 12 housed in the upper edge of the door 7; such reflecting element 16 is arranged with the entry ray face directed towards the spy-lights 12, and with the face from which the reflected rays exit directed towards the front of the machine, i.e. towards the user; in such way, exploiting the principle of optical reflection of light rays, coming from the luminous spy-light or lights 12, the user is able to control on the frontal part of the element 16 the on or off state of the spy-lights of interest. Such element 16 can therefore be defined as carrying out the function of an optical fibre.

[0018] It therefore appears clear as to how, according to the invention, the user even with the door closed has the possibility of consulting according to needs the signalling elements 12 for carrying out the desired control; the variety of such controls naturally depends on the number of spy-lights provided: for instance only one light could be provided, apt at indicating the on or off state of the machine, but it is clear that other signalling spy-lights 12 could be provided, for instance each indicating the point reached of a determined operative phase of those provided in a washing cycle selected by the user, or indicating eventual abnormal functioning conditions of the machine (such as, for instance, the absence of detergents, the absence of salt of the softener, the blocking of a spraying arm, failure to heat the washing water, etc.).

[0019] It is however clear that the aforementioned reflecting elements 16 can be of a number being equal to the total number of signalling devices 12 allocated on the upper edge 10 of the door, or fewer, being limited only to the spy-lights of interest; as said previously, it could be of interest to the user to have information relating to the on or off state of the dishwashing machine: in this case it would only be necessary to supply on the upper protrusion 9 a single element 16, being of smaller dimensions than that illustrated in figure 3A, able to reflect or transmit the light in correspondence of the single spy-light which indicates the ON state (light on) or the OFF state (light off) of the machine. Thus, according to the invention the signalling spy-lights 12, even though hidden from view and protected by the protrusion 9 and by the work top 4, can be easily controlled without having to open the door 7 for their direct viewing, and therefore, interrupt an eventual washing cycle and without the risks of eventual jets of water. In the practical realisation of the invention, the elements apt at optically reflecting or transmitting the light coming from the spy-lights 12 can be constituted by mirror systems, prisms or other polyhedrons: it is important, however, that they are realised in such a way as to be housed inside the narrow frontal protrusion 9 of the cabinet of the machine, without hindering the movements of the door; moreover it is not necessary that such reflective elements be made up of particular materials, studied with the present application in mind: it is in fact sufficient the refraction index of the chosen material falls within a suitable interval for reflecting the wave length of the visible

electromagnetic radiation coming from the spy-light or lights: such materials can be, for instance, transparent glass, Plexiglas®, or other transparent plastic material, etc.

[0020] The faces of the reflecting elements will be shaped according to the angle of incidence and of the reflection desired and in a way that the user, externally, is able to perceive the luminous radiation.

[0021] In the most simplest embodiment, of the type mentioned above, good results of viewing the light are obtained, for control by way of the user, but such view may result in being a little imprecise, due to the inevitable refractions through the means of which the element 16 is made, and due to the multiple reflections. An embodiment of the present invention of this type (mirrors or polyhedrons of transparent glass or transparent plastic material) can be perfectly suitable in the case in which the user is offered the possibility of controlling a single spy-light (e.g. ON/OFF) or numerous lights being sufficiently distant one from the other.

[0022] So as that the control can be carried out on numerous functions of the machine, particularly with the spy-lights being relatively close one to the other, the luminous information has to result in being clear and easily distinguished, without being an indistinct out-of-focus blur. With such purpose, in order to be realised so as to serve numerous signalling elements 12, the element 16 can contain appropriate separating baffles, able to avoid that the switching on of a spy-light also causes the illumination of the adjacent zones of the element 16, provided for transmitting the light coming from the other spy-lights.

[0023] Naturally it is possible to adopt systems being more sophisticated than those mentioned above, for instance substituting the light reflecting element or elements with one or more optical fibres; in such case the optical fibre, arranged in correspondence with the luminous spy-light of interest to the user, is able to convey electromagnetic radiation energy coming from the light source to a single localised area, on the frontal protrusion 9 of the cabinet of the machine, towards the exterior and therefore in the direction of the user.

[0024] From that described above it is clear that with the latter embodiment the functioning of the present invention is practically the same as that indicated previously with reference to the use of reflective elements; it is however to be considered that the use of fibre optics allows for viewing simultaneously a lot of information, conveying towards the user the state (on/off) of each spy-light of interest in a clear and defined manner, and avoiding refraction and multiple reflections, responsible of the fact of not being able to clearly distinguish two or more different reflected light sources.

[0025] It therefore appears clear that the possible implementations of the invention are numerous to the skilled man, without departing from the basic idea of allowing the control of the operational state of a "totally hidden" machine, even with the door closed, by way of

means able to transfer (i.e. optically reflect or transmit, or convey) towards the frontal part of the machine the light coming from the signalling devices provided along the upper edge of the door.

[0026] It is also clear that, in any case, the possible implementations of the invention are of simple construction, low costs and do not present any aesthetic prejudice (form figures 3C and 3D it is seen how the presence of the element 16 is of practically no aesthetic prejudice to the overall appearance of the machine).

[0027] In particular, in the case of the example herein, only the preparation of one or more seats is required on the frontal protrusion 9 of the cabinet of the machine, where the element 16 is housed; the position and dimensions of the element 16 can, as mentioned, be chosen with great freedom, considering the fact however of not causing aesthetic prejudices to the decorative panel of the machine. Furthermore, the material of which the element 16 is constructed is of no particular importance, in relation to the purpose of viewing one or more distant spy-lights. Therefore it is possible to adopt a wide choice of materials conveniently available on the market. The same is so in the case of numerous adjacent spy-lights, with the implementation of the invention by way of fibre optics for conveying the luminous radiation; even such realisation does not require any substantial modifications to the cabinet or of the door of the machine, or of the upper work top of the machine; the costs of such implementation are however considerably small, compared to the utility of the invention and as the final solution is of no aesthetic prejudice. A further advantage is that the invention can be implemented in a simple and economic manner directly by the producer of modular furniture, during the course of installing the dishwashing machine within the users residence.

[0028] From the above, it results in being clear how the invention allows for realizing a dishwashing machine of the "totally hidden" type in which the viewing devices, while remaining protected with the door closed by the upper protrusion of the cabinet of the machine, can be consulted according to the needs of the user, without having to open the door of the dishwasher, and thus without having to carry out difficult or potentially dangerous operations.

[0029] From the given description the characteristics of the household appliance of the built-in type, in particular a dishwashing machine, according to the present invention result in being clear, as do its advantages.

[0030] It is clear that numerous variants are possible by the skilled man, to the dishwashing machine described as an example, without for this departing from the novelty principles inherent in the inventive idea.

[0031] For instance the spy-lights 12, or the elements 16, could be differently coloured, one for each function of the machine to be controlled. Moreover the reflecting or conveying elements 16 of light could be fixed to the lower surface of the work top 4, rather than the protru-

sion 9, still remaining in correspondence with the signalling devices 12, similarly, the elements 16 could be fixed to the upper edge 10 of the door 7, directly in contact with the signalling devices 12, or directly on the frontal decorative panel, by way of providing an appropriate seat or by the simple gluing of the parts; it is therefore clear that the producers of dishwashing machines could supply assembly kits of the elements 16, to supply to the retailers of modular furniture or directly to the final user, eventually also for the implementation of the invention on machines of the known type.

Claims

1. Household appliance of the built-in type, in particular a dishwashing machine, comprising a cabinet (6) and a frontal door (7), where on an edge (10) of the door (7) at least one luminous signaling device (12) is provided, in particular a spy-light, indicating a determined operational condition of the appliance (15), said luminous signaling device (12) resulting, with the door (7) closed, hidden and protected by a surface (9, 4) extending substantially parallel to said edge (10) of the door (7) in which said luminous signaling device (12) is provided, characterised in that means (16) are provided for transferring the light emitted from the luminous signalling device (12) towards the front of the door (7), so as to allow the control of the operational condition of the appliance (15) indicated by the luminous signaling device (12) without having to open the door.
2. Household appliance, according to claim 1, characterised in that the door (7) is covered by a decorative frontal panel.
3. Household appliance, according to claim 1, characterised in that said means comprise one or more elements (16) able to optically reflect and/or transmit and/or convey the light emitted by at least one luminous signalling device (12) provided on said upper edge of the door (7).
4. Household appliance, according to claim 3, characterised in that said element or elements (16) are located between said edge (10) of the door and said surface (9, 4) parallel to said edge.
5. Household appliance, according to at least one of the previous claims, characterised in that said element or elements (16) frontally extend at least to the frontal surface of the door (7) and in particular, in the presence of a decorative panel, at least to the frontal surface of the latter.
6. Household appliance, according to claim 3, characterised in that said element or elements (16) are realised of a material having a refraction index

being suitable to transfer the wave length of the visible electromagnetic radiation coming from at least one luminous signaling device (12).

7. Household appliance, according to claim 3, characterised in that said element or elements (16) comprise systems of mirrors and/or prisms or other polyhedrons, the faces of which are shaped based on the angles apt at transferring the luminous radiation coming from at least one luminous signaling device (12) towards the frontal wall of the door.
8. Household appliance, according to claim 3, characterised in that said element or elements (16) comprise fibre optics apt at conveying the energy of the electromagnetic radiation coming from at least one luminous signaling device (12) in a localised area.
9. Household appliance, according to at least one of the previous claims, characterised in that said element or elements (16) are arranged with the entry ray face directed to at least one luminous signaling device, and with the face from which the ray transmitted exits directed towards the frontal part of the machine.
10. Household appliance, according to at least one of the previous claims, characterised in that at least one element (16) is provided for transferring the light coming from a signaling device (12) that indicates the ON or OFF state of the appliance.
11. Household appliance, according to at least one of the previous claims, characterised in that one or more elements (16) are provided for transferring the light coming from a signalling device (12), that indicates the reaching of determined operative phases from among those provided in the range of an operative cycle of the appliance and/or coming from one or more signalling devices (12) indicating abnormal operational conditions of the appliance, such as, for instance in the case of a dishwashing machine, the lack of detergent, the lack of salt in a softener, the blocking of a spraying arm, the non heating of the washing water.
12. Household appliance, according to at least one of the previous claims, characterised in that said elements (16) are of a number being equal to that of the total of signaling devices (12) or of a lower number, or at least one single element (16) is provided apt at transferring the light coming from a number of different signalling devices (12).
13. Household appliance, according to the previous claim, characterised in that said single element (16) comprises separating baffles, with the aim of avoiding that the light coming from a first signaling device

(12) causes the illumination of an adjacent zone of the single element (16), provided for a second signaling device (12).

14. Household appliance, according to at least one of the previous claims, characterised in that said element or elements (16) are fixed to a frontal protrusion (9) of the cabinet (6) of the appliance, or to an upper work top (4) of the appliance, or to the edge (10) of the door (7) or on said decorative frontal panel. 5 10
15. Household appliance, according to at least one of the previous claims, characterised in that said signaling device or devices (12) and/or said element or elements (16) provide a plurality of different colours. 15
16. Household appliance, according to claim 1, characterised in that said means (16) are provided as a kit for the assembly during the phase of installing the appliance, said kit comprising at least one element (16) to be located between said edge (10) of the door (7) and said surface (9, 4) parallel to said edge (10), said element (16) being able to optically reflect and/or transmit and/or convey the light emitted by said luminous signaling device (12) provided on said upper edge of the door (7) towards the front of the door (7). 20 25

Patentansprüche

1. Einbau-Haushaltsgerät, insbesondere Geschirrspülmaschine, mit einem Gehäuse (6) sowie einer Vordertür (7), wobei an einem Rand (10) der Tür (7) zumindest eine Leuchtsignaleinrichtung (2), insbesondere ein Spionlicht, vorgesehen ist, welche einen bestimmten Betriebszustand des Gerätes (15) anzeigt, wobei die Leuchtsignaleinrichtung (12) bei geschlossener Tür (7) verborgen und durch eine Fläche (9, 4) geschützt ist, die sich im wesentlichen parallel zu diesem Rand (10) der Tür (7) erstreckt, an dem die Leuchtsignaleinrichtung (12) vorgesehen ist, 35 40
dadurch gekennzeichnet, daß Mittel (16) zum Übertragen des von der Leuchtsignaleinrichtung (12) abgestrahlten Lichtes in Richtung der Vorderseite der Tür (7) vorgesehen sind, so daß die Überprüfung des Betriebszustandes des Gerätes (15), der durch die Leuchtsignaleinrichtung (12) angezeigt wird, ohne Öffnen der Tür möglich wird. 45 50
2. Haushaltsgerät nach Anspruch 1, 55
dadurch gekennzeichnet, daß die Tür (7) durch eine dekorative Frontverkleidung abgedeckt ist.
3. Haushaltsgerät nach Anspruch 1,
dadurch gekennzeichnet, daß die Mittel eines

oder mehrere Elemente (16) enthalten, die in der Lage sind, das von zumindest einer an dem oberen Rand der Tür (7) vorgesehenen Leuchtsignaleinrichtung (12) abgestrahlte Licht optisch zu reflektieren und/oder zu übertragen und/oder zu leiten.

4. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, daß das oder die Elemente (16) zwischen dem Rand (10) der Tür und der parallel zu dem Rand verlaufenden Fläche (9, 4) angeordnet sind.
5. Haushaltsgerät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß sich das oder die Elemente (16) nach vorne zumindest zu der vorderen Oberfläche der Tür (7) erstrecken und insbesondere bei Vorhandensein einer Schmuckverkleidung zumindest zu der vorderen Oberfläche der Verkleidung erstrecken.
6. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, daß das oder die Elemente (16) durch ein Material gebildet sind, welches einen Brechungsindex aufweist, der geeignet ist, die Wellenlänge der sichtbaren elektromagnetischen Strahlung zu übertragen, welche von zumindest einer Leuchtsignaleinrichtung (12) stammt.
7. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, daß das oder die Elemente (16) Spiegelsysteme und/oder Prismensysteme oder andere Polyedersysteme enthalten, deren Flächen je nach den Winkeln, die geeignet sind, die Lichtstrahlung, welche von zumindest einer Leuchtsignaleinrichtung (12) stammt, in Richtung der Vorderwand der Tür zu übertragen, gestaltet sind.
8. Haushaltsgerät nach Anspruch 3,
dadurch gekennzeichnet, daß das oder die Elemente (16) eine Faseroptik aufweisen, die in der Lage ist, die Energie der elektromagnetischen Strahlung, welche von zumindest einer Leuchtsignaleinrichtung (12) stammt, in einen lokalisierten Bereich zu leiten.
9. Haushaltsgerät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß das oder die Elemente (16) so angeordnet sind, daß die Strahleneintrittsfläche zumindest zu einer Leuchtsignaleinrichtung ausgerichtet ist, und daß die Fläche, von der die übertragenen Strahlen austreten, in Richtung des vorderen Teils der Maschine ausgerichtet ist.
10. Haushaltsgerät nach zumindest einem der vorste-

- henden Ansprüche,
dadurch gekennzeichnet, daß zumindest ein Element (16) zum Übertragen des von einer Signaleinrichtung (12) stammenden Lichtes vorgesehen ist, welches den EIN- oder AUS-Zustand des Gerätes anzeigt.
11. Haushaltsgesät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß ein oder mehrere Elemente (16) zum Übertragen des Lichtes vorgesehen sind, welches von einer Signaleinrichtung (12) stammt und welches das Erreichen bestimmter Betriebsphasen unter den Phasen anzeigt, die im Laufe eines Betriebszyklus des Gerätes vorgesehen sind, und/oder welches von einer oder mehreren Signaleinrichtungen (12) stammt und welches abnormale Betriebszustände des Gerätes, wie beispielsweise im Falle einer Geschirrspülmaschine das Nichtvorhandensein eines Spülmittels, das Nichtvorhandensein von Salz in einer Weichmachereinrichtung, das Blockieren eines Sprüharms, das Nichterhitzen des Waschwassers, anzeigt.
12. Haushaltsgesät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß die Zahl der Elemente (16) gleich oder kleiner der Summe der Signaleinrichtungen (12) ist oder zumindest ein einzelnes Element vorgesehen ist, welches in der Lage ist, das von einer Anzahl verschiedener Signaleinrichtungen (12) stammende Licht zu übertragen.
13. Haushaltsgesät nach dem vorstehenden Anspruch,
dadurch gekennzeichnet, daß das einzelne Element (16) Trennwände aufweist, um zu vermeiden, daß das von einer ersten Signaleinrichtung (12) stammende Licht eine benachbarte Zone des einzelnen Elements (16) beleuchtet, die für eine zweite Signaleinrichtung (12) vorgesehen ist.
14. Haushaltsgesät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß das oder die Elemente (16) an einem vorderen Vorsprung (9) des Gerätegehäuses (6) oder an einer oberen Arbeitsabdeckung (4) des Gerätes oder an dem Rand (10) der Tür (7) oder an der vorderen Schmuckverkleidung angebracht sind.
15. Haushaltsgesät nach zumindest einem der vorstehenden Ansprüche,
dadurch gekennzeichnet, daß die Signaleinrichtung oder die Signaleinrichtungen (12) und/oder das Element oder die Elemente (16) in mehreren unterschiedlichen Farben vorhanden sind.
16. Haushaltsgesät nach Anspruch 1,
dadurch gekennzeichnet, daß die Mittel (16) als eine Montageeinheit zum Einbau während der Geräteinstallation vorgesehen sind, wobei die Einheit zumindest ein zwischen dem Rand (10) der Tür (7) und der parallel zu dem Rand (10) verlaufenden Fläche (9, 4) anzubringendes Element enthält, wobei das Element (16) in der Lage ist, das von der Leuchtsignaleinrichtung (12), die an dem oberen Rand der Tür (7) vorgesehen ist, abgestrahlte Licht in Richtung der Vorderseite der Tür (7) optisch zu reflektieren und/oder zu übertragen und/oder zu leiten.

15 Revendications

- Appareil électroménager de type encastrable, notamment un lave-vaisselle, comprenant un coffre (6) et une porte frontale (7), dans lequel un dispositif lumineux de signalisation (12) au moins est placé à un bord (10) de la porte (7), notamment une lampe témoin, indiquant un état déterminé de fonctionnement de l'appareil (15), le dispositif lumineux (12) de signalisation, lorsque la porte (7) est fermée, étant caché et protégé par une surface (9, 4) qui s'étend en direction pratiquement parallèle au bord (10) de la porte (7) auquel est disposé le dispositif lumineux (12) de signalisation, caractérisé en ce qu'un dispositif (16) est destiné à transférer la lumière émise par le dispositif lumineux (12) de signalisation vers l'avant de la porte (7) pour permettre le contrôle de l'état de fonctionnement de l'appareil électroménager (15) indiqué par le dispositif lumineux (12) de signalisation sans nécessiter l'ouverture de la porte.
- Appareil électroménager selon la revendication 1, caractérisé en ce que la porte (7) est recouverte d'un panneau frontal décoratif.
- Appareil électroménager selon la revendication 1, caractérisé en ce que ledit dispositif comporte un ou plusieurs éléments (16) qui peuvent réfléchir et/ou transmettre et/ou transférer optiquement la lumière émise par au moins un dispositif lumineux (12) de signalisation placé au bord supérieur de la porte (7).
- Appareil électroménager selon la revendication 3, caractérisé en ce que l'élément ou les éléments (16) sont placés entre le bord (10) de la porte et la surface (9, 4) qui est parallèle au bord.
- Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce que l'élément ou les éléments (16) s'étendent du côté frontal au moins vers la surface frontale de la porte (7) et en particulier en présence d'un panneau

- décoratif, au moins vers la surface frontale de celui-ci.
6. Appareil électroménager selon la revendication 3, caractérisé en ce que l'élément ou les éléments (16) sont réalisés en un matériau ayant un indice de réfraction qui convient au transfert de la lumière à une longueur d'onde du rayonnement électromagnétique visible provenant d'au moins un dispositif lumineux (12) de signalisation. 5
 7. Appareil électroménager selon la revendication 3, caractérisé en ce que l'élément ou les éléments (16) comportent des systèmes de miroirs et/ou de prismes ou d'autres polyèdres dont les faces ont une configuration correspondant à des angles qui permettent le transfert du rayonnement lumineux provenant d'au moins un dispositif lumineux (12) de signalisation vers la paroi avant de la porte. 10
 8. Appareil électroménager selon la revendication 3, caractérisé en ce que l'élément ou les éléments (16) comportent des fibres optiques qui peuvent transférer l'énergie du rayonnement électromagnétique provenant d'au moins un dispositif lumineux (12) de signalisation dans une zone localisée. 15
 9. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce que l'élément ou les éléments (16) sont disposés de manière que la face des rayons d'entrée soit dirigée vers au moins un dispositif lumineux de signalisation, la face dont sortent les rayons transmis étant dirigée vers la partie frontale de la machine. 20
 10. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce qu'au moins un élément (16) est destiné au transfert de la lumière provenant du dispositif (12) de signalisation et qui indique l'état de fonctionnement ou d'arrêt de l'appareil électroménager. 25
 11. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce qu'un ou plusieurs éléments (16) sont destinés au transfert de la lumière provenant d'un dispositif (12) de signalisation qui indique que des phases déterminées de fonctionnement, parmi celles qui sont comprises dans une gamme d'un cycle de fonctionnement de l'appareil électroménager, ont été atteintes et/ou provenant d'un ou plusieurs dispositifs de signalisation (12) qui indiquent les conditions anormales de fonctionnement de l'appareil électroménager, par exemple dans le cas d'un lave-vaisselle, le manque de détergent, le manque de sel dans un liquide de rinçage, le bouchage du bras de pulvérisation, et l'absence de chauffage de l'eau de lavage. 30
 12. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce que les éléments (16) sont en nombre égal au nombre total de dispositifs (12) de signalisation ou en nombre inférieur ou au moins un élément unique (16) est disposé afin qu'il puisse transférer la lumière provenant d'un certain nombre de dispositifs différents (12) de signalisation. 35
 13. Appareil électroménager selon la revendication précédente, caractérisé en ce que l'élément unique (16) comprend des déflecteurs de séparation destinés à éviter que la lumière provenant d'un premier dispositif de signalisation (12) ne provoque l'éclairement d'une zone adjacente de l'élément unique (16) prévue pour un second dispositif de signalisation (12). 40
 14. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce que l'élément ou les éléments (16) sont fixés sur une saillie frontale (9) du coffre (6) de l'appareil électroménager ou sur un plan supérieur de travail (4) de l'appareil électroménager ou au bord (10) de la porte (7) ou sur le panneau frontal décoratif. 45
 15. Appareil électroménager selon l'une au moins des revendications précédentes, caractérisé en ce que le dispositif ou les dispositifs de signalisation (12) et/ou l'élément ou les éléments (16) ont plusieurs couleurs différentes. 50
 16. Appareil électroménager selon la revendication 1, caractérisé en ce que le dispositif (16) est sous forme d'un kit destiné à être monté pendant la phase d'installation de l'appareil électroménager, le kit comprenant au moins un élément (16) destiné à être placé entre le bord (10) de la porte (7) et la surface (9, 4) qui est parallèle au bord (10), ledit élément (16) pouvant réfléchir et/ou transmettre et/ou transférer optiquement la lumière émise par le dispositif lumineux (12) de signalisation placé au bord supérieur de la porte (7) vers l'avant de la porte (7). 55

FIG. 1

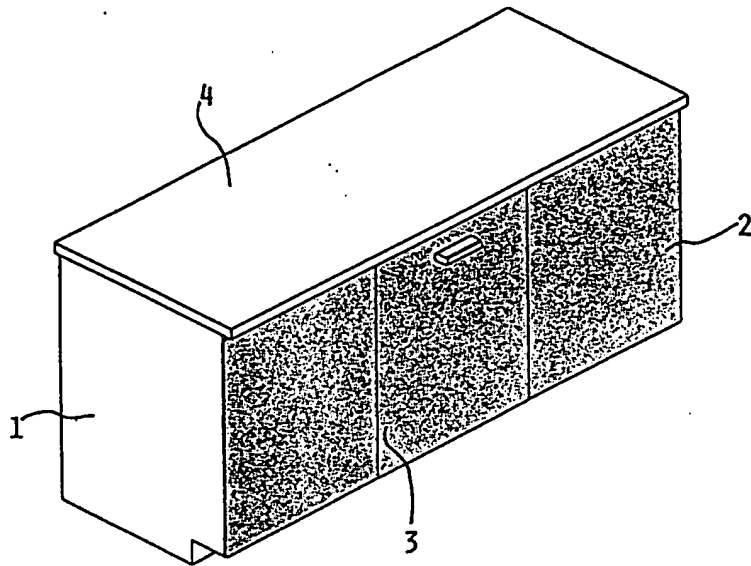


FIG. 2A

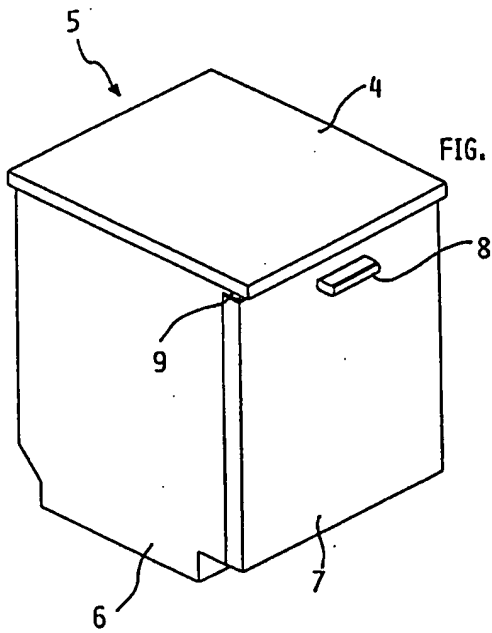


FIG. 2B

